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Friday, May 04, 2007

Micropayments redux

Clay Shirky describes how micropayments proponent Scott McCloud seems to have thrown in the towel, and he points to my old micropayments paper. A few comments on Shirky's excellent description of the micropayments problem and on my old paper may be in order.

When I wrote that paper I thought of micropayments as payments of a granularity smaller than the 1 cent granularity of traditional prices, or very close to it. My prediction was that the granularity of payments on the Internet would be somewhat higher than traditional price granularity. This was in a response to the fascinating Digital Silk Road/Agorics idea that you could buy and sell IP packet transmission, memory space, and the like at unprecedentedly low granularities like a thousandth of a cent. There is basically no important computational transaction cost barrier to such payments, but I described mental transaction cost barriers that still have not been surmounted. The efforts of micropayment engineers focusing on computational rather than mental transaction costs were and are misguided.

So when the Post Office raises postage rates by 1 cent, or charges a few cents more for one class of mail than another, that's very close to what I thought of as a micropayment and is what I was predicting would be very hard (not impossible) to do productively on the Internet. But when iTunes sells a song for a dollar, regardless of how popular the song is, that's a price granularity that is sufficiently high to overcome mental transaction costs. Nowadays many people call even a dollar a "micropayment" because it's smaller than your typical credit card payment, and this muddles the issue. Paypal and some services like iTunes have shown that there's at least a significant niche market below typical minimum credit card payment, but it hasn't shown that micropayments of the kind I talked about are feasible.

I don't claim that price granularities of near 1 cent or below will never make economic sense on the Internet, but they do require a sophisticated attention to preference revelation and mental transaction costs that so far has generally been lacking. Something like micropayments, or at least low-granularity accounting, is happening on the advertising payment end rather than the consumer payment end. The business of selling eyeballs wholesale is much better able to automate the sophisticated accounting and auditing that is required for such schemes to work. Some proxy measures for eyeballs, e.g. based on "hits", have proven to be feasible when computers rather than humans can reliably do the counting at any granularity below thousands. Arguably some online games have also achieved low price granularities, although here payments are part of the entertainment value of the game (as in traditional games like Monopoly(tm)) rather than just a necessary transaction cost.

The extent to which iTunes and the like can compete with free content is another issue which Shirky describes well. This competition

Pages

- Home

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Nick Szabo

"A premier thinker about history, law and economics, and the lessons they have for security." -- Adam Shostack, Emergent Chaos

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interacts with price granularity insofar as the mental transaction costs put a floor on content prices and competition from free content (artists seeking fame rather than money) puts a ceiling on content prices. Shirky plausibly argues that there is little or (ultimately) no room in between this floor and ceiling leaving little and perhaps ultimately no significant market for online content funded directly by the consumer.

Here are a couple more aspects of micropayments and price granularity I have long believed but I'm not sure I've sufficiently made clear:

(1) As more low-wealth people get on the Internet, price granularity will naturally fall as such consumers are generally willing to put more effort and attention into shopping per money saved. Much of the reason price granularity has been higher on the Internet is because its users have higher than average wealth. However, unlike point (2) below this effect is not very large and won't by itself get us below traditional price granularities.

(2) Where the mental transaction/preference revelation problem can be solved for high-wealth consumers at 1 cent granularity for a particular kind of Internet transaction, there is nothing magical about 1 cent, and it might well be easy to further reduce price granularity to a thousandth or a millionth of a cent. In that sense I'm a big fan of the agorics approach -- since "micropayments" has been taken to include much larger payments perhaps we could call them "nanopayments" -- and I hope I haven't overly discouraged people from looking at these fascinating and potentially quite lucrative and revolutionary possibilities.

Posted by Nick Szabo at 12:36 PM

7 comments:

Anonymous said...

So, you don't think that machines can do price discovery?

That they can't participate in auctions?

;-)

Cheers,
RAH

5:23 PM

nick said...

A program can participate in auctions and price discovery, but only usefully so if it has a sufficiently accurate model of the preferences of its master. The costs of determining, articulating, and inputting those preferences are the mental transaction costs of which I speak.

3:50 PM

Anonymous said...

Blog Archive

- ► 2018 (1)
- ► 2017 (3)
- ► 2016 (4)
- ► 2015 (3)
- ► 2014 (3)
- ► 2013 (3)
- ► 2012 (8)
- ► 2011 (12)
- ► 2010 (9)
- ► 2009 (29)
- ► 2008 (55)
- ▼ 2007 (47)
  - ► December (1)
  - ► October (2)
  - ► September (8)
  - ► August (10)
  - ► July (4)
  - ► June (4)
  - ▼ May (8)
    - Why legal procedure is central to politics
    - Microkernel government
    - Juristopia
    - Debunking civics class mythologies
    - Two guest posters and a fun new blog
    - Towards a digital and private common law
    - Combine tipping with aggregators
    - Micropayments redux
  - ► April (1)
  - ► March (2)
  - ► February (4)
  - ► January (3)
- ► 2006 (130)

Price discovery's about *price*, isn't it?

There are, literally, "lots", of things that are standardized enough out there not to think about.

Virtually all internet packets, for instance.

All securities, by definition. And so on.

Cheers,
RAH

7:55 AM

Nick Szabo said...

RAH, there's no such thing as a market that is so standardized that the people paying good money in it don't ever have to think about it. And there's no point in having a market for Internet packets if everbody's Internet packet is to be treated the same. Simple resource allocation algorithms will allocate packets at least as efficiently as a market in that case.

A market -- any useful market whatsoever -- is based on people having different budgets and preferences for the thing sold. For that to be reflected in auction software, said preferences have to be input into said software. And there's a mental transaction cost limit to doing that. People are not going to run around bidding two cents here for this YouTube video and a half cent there for that database on Internet auctions just to be able to get good bandwidth or response time. The hassle factor -- i.e. mental transaction costs -- for expressing preferences at such a high level of granularity are far too high.

If, on the other hand, somebody can figure out a way for the user to input their budget and preferences, such that the mental transaction costs are sufficiently low -- perhaps by saying I'll pay ten cents a megabyte for any video at any time of day and five cents a megabyte for any database, and showing the running totals with meters that normally just under a toolbar icon -- then it may work. But notice the higher level of granularity the preferences are expressed at the less useful information the market has to work with (here we've lost for example important preferences between differernt times, different kinds of content, etc.) -- thus the less efficient the price system is at allocating the commodity. The proper tradeoff is probably very difficult to find or it may not in many cases even exist vis-a-vis a standard resource allocation algorithm like those already in use for Internet packets.

The problem is far worse still for heterogenous content, such as the silly proposals for browsers to pay authors one or two cents a page. (Selling eyeballs via keywords is quite a different matter -- it's wholesale rather than retail and the humans do the counting by the tens of thousands of hits and have algorithms that make it safe for computers to do the finer-granularity counting -- which is why Google AdWords and the like have been successful).

So far micropayments people have been mostly ignoring this crucial user interface / mental transaction cost problem and (because they've been ignoring it, and because it's usually a very hard problem) generally have not solved that problem. Thus micropayments have failed.

Price granularity is relevant to micropayments because there's no point in having a granularity of payments lower than the price granularity of the markets they are going to serve. A large amount of effort has been wasted on conserving on computational transaction costs for sub-penny payments when by far the dominant cost of such systems are the mental transaction costs.

Your comment about securities is even more puzzling, because obviously different issues of securities are different, and customers have to express their preference about the kind of security as well as the price. Mental transaction costs are one of the reasons why we often see round lots, why reverse splits are often used to avoid becoming a penny stock, and why we don't see sub-penny stocks. Even if the other transaction costs were zero and brokers charged nothing for trades, we'd still live in a world of mostly round lots and no general use of sub-penny stocks due to mental transaction costs. We could have sub-penny (and even nanopenny) derivatives for use in automated arbitrage, since that's a case where preference expression straightforward. But it's a special case.

Potentially my market translator could allow nanoderivatives in some other areas, but the key again is translating preferences input at a high granularity into equivalent low granularity preferences -- a preference compiler. That's what the market translator is intended to do. But just me or anybody else pointing out such a possibility is hardly evidence that it will be common, much less that it will be easy, much less that the issue can be blithely ignored while we obsess about how to squeeze the computational transaction cost of a micropayment down from a hundredth of a penny to a two-hundredth!

3:00 PM

Anonymous said...

I think, as we discovered with risk, the problem will turn out to be a lot simpler than you make it out to be. Price discovery is primarily a random process. It can be done by machines.

There's nothing mystical about human choices. Machines can have choices, too.

Cheers,
RAH

9:22 PM

Anonymous said...

...also, I'm not sure I can abandon the concepts of fungibility and exchangeablity as easily as you seem to be able to do.

:-)

Cheers,
RAH

10:13 PM

dilys said...

I'm a real lazybones. The only way I would do micropayments -- and that would be around $.01, maybe to hear or download an obscure song -- would be to buy upfront a, say, $2 cookie for my computer so that to pay out these munificents sums would involve an easy click with a password.

Should be possible.

4:26 AM

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